

Appl. No. 10/807,004
Amdt dated August 1, 2007
Reply to Office Action of April 11, 2007
Att. Docket No.: 1279-281C1

Filing date: March 22, 2004
Applicant Name: Daniel E. Morse et al.
Examiner: Margaret O. Moore
Art Unit: 1712

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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (original) A method for forming a non-silicon metalloid-oxane and metallo-oxane, or mixed poly(silicon/metallo)oxane polymer networks, or their hydrido, organic, or organometallic derivatives, comprising condensing an alkoxide substrate with another alkoxide material at neutral or near neutral pH using a catalyst comprising a molecule having a nucleophilic group that displaces alkanol from said alkoxide substrate facilitating solvolysis to initiate structure-directed condensation with said another alkoxide, wherein either or both of said alkoxides is selected from the group consisting of organosilicon alkoxides; hydrido-silicon alkoxides; metallo alkoxides; organometallo-alkoxides; hydrido metallo-alkoxides; metalloid alkoxides; organometalloid alkoxides; and hydrido metalloid alkoxides.
2. (original) The method of Claim 1 wherein said structure-directed condensation is by nucleophilic attack.
3. (original) The method of Claim 1 wherein said nucleophilic group forms a transitory intermediate in facilitating solvolysis.
4. (original) The method of Claim 3 wherein said transitory intermediate is covalent.
5. (original) The method of Claim 1 comprising using a group that interacts with said nucleophilic group to increase its nucleophilicity.
6. (original) The method of Claim 5 wherein said interaction is by hydrogen bonding.

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7. (currently amended) ~~The method of claim 1 wherein either or both of said alkoxides is selected from:~~ A method for forming a non-silicon metalloid-oxane and metallo-oxane, or mixed poly(silicon/metallo)oxane polymer networks, or their hydrido, organic, OR organometallic derivatives, comprising condensing an alkoxide substrate with another alkoxide material or with another alkoxide-like material at neutral or near neutral pH using a catalyst comprising a molecule having a nucleophilic group that displaces alkanol from said alkoxide substrate facilitating solvolysis to initiate structure-directed condensation with said another alkoxide-like material, wherein either or both of said alkoxides is selected from the group consisting of
- ~~(a)~~ non-silicon metalloid alkoxides, metal alkoxides, inorganic and organic oxygen-containing chelates of silicon, and inorganic and organic esters, hydrolyzable salts, complexes or conjugates of the hydroxides of silicon, non-silicon metalloids or metals; and (b) any organic, organometallic and hydrido derivatives of the foregoing.
8. (currently amended) The method of claim ~~1~~ 7 wherein either or both of said alkoxides alkoxide substrate or alkoxide material is an organosilicon alkoxide.
9. (original) The method of claim 8 wherein said organosilicon alkoxide is methyl-, phenyl-, or dansylpropyl-triethoxysilane.
10. (currently amended) The method of claim ~~1~~ 7 wherein either or both of said alkoxides alkoxide substrate or alkoxide material is a hydrido-silicon alkoxide.
11. (original) The method of claim 10 wherein said hydrido-silicon alkoxide is hydridotriethoxysilane.
12. (currently amended) The method of claim 7 wherein either or both of said alkoxides alkoxide substrate or alkoxide material is a non-silicon metallo alkoxide.
13. (currently amended) The method of claim 12 wherein said non-silicon metallo alkoxide is bis(lactato) titanium.

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14. (original) The method of claim 1 wherein either or both of said alkoxides is an organometallo-alkoxide.
15. (original) The method of claim 14 wherein said organometallo-alkoxide is phenyl-bis(lactato) titanium.
16. (currently amended) The method of claim 7 wherein either or both of said ~~alkoxides~~ alkoxide substrate or alkoxide material is a non-silicon hydrido metallo-alkoxide.
17. (currently amended) The method of claim 16 wherein said non-silicon hydrido metallo-alkoxide is hydridobis(lactato) titanium.
18. (currently amended) The method of claim 7 wherein either or both of said ~~alkoxides~~ alkoxide substrate or alkoxide material is a non-silicon metalloid alkoxide.
19. (currently amended) The method of claim 18 wherein said non-silicon metalloid alkoxide is tetraorthoethoxygermanate.
20. (currently amended) The method of claim 7 wherein either or both of said ~~alkoxides~~ alkoxide substrate or alkoxide material is an a non-silicon organometalloid alkoxide.
21. (currently amended) The method of claim 20 wherein said non-silicon organometalloid alkoxide is methyl-, phenyl-, or dansylpropyl-triethoxygermane.
22. (currently amended) The method of claim 7 wherein either or both of said ~~alkoxides~~ alkoxide substrate or alkoxide material is a non-silicon hydrido metalloid alkoxide.
23. (currently amended) The method of claim 22 wherein said non-silicon hydrido metalloid alkoxide is hydrido-triethoxygermane.

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24. (original) The method of claim 7 wherein there is formed as a product the corresponding non-silicon metallo-oxane and metallo-oxane, or mixed poly(silicon/metallo)oxane, polymer networks, or their hydrido, organic, or organometallic derivatives.
25. (original) The method of Claim 1 wherein said catalyst molecule is selected from proteins, enzymes, peptides, non-peptide-based polymers, small molecules, supramolecular aggregates, filaments, or arrays or assemblies thereof.
26. (original) The method of Claim 25 wherein said catalyst molecule is a protein.
27. (original) The method of Claim 25 wherein said catalyst molecule is an enzyme.
28. (original) The method of Claim 27 wherein said enzyme is a silicatein.
29. (original) The method of Claim 27 wherein said enzyme is a protease.
30. (original) The method of Claim 27 wherein said enzyme is a peptidase.
31. (original) The method of Claim 27 wherein said enzyme is a hydrolase.
32. (original) The method of Claim 31 wherein said hydrolase is selected from the group consisting of amidase, esterase and lipase.
33. (original) The method of Claim 27 wherein said enzyme is a catalytic triad enzyme.
34. (original) The method of Claim 1 wherein said catalyst molecule is a peptide.
35. (original) The method of Claim 34 wherein said peptide contains lysine or poly lysine.
36. (original) The method of Claim 34 wherein said peptide contains serine or polyserine.

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37. (original) The method of Claim 34 wherein said peptide contains a tyrosine.
38. (original) The method of Claim 34 wherein said peptide contains a histidine.
39. (original) The method of Claim 34 wherein said peptide contains cysteine, oligocysteine or poly-cysteine.
40. (original) The method of Claim 34 wherein said peptide contains a nucleophilic catalytic side-chain.
41. (original) The method of Claim 40 wherein said nucleophilic catalytic side-chain is contributed by serine, cysteine, histidine or tyrosine.
42. (original) The method of Claim 34 wherein said peptide contains a hydrogen-bonding amine.
43. (original) The method of Claim 1 wherein said catalyst molecule is a non-peptidebased polymer that operates by a mechanism of catalysis similar to that utilized by silicateins..
44. (original) The method of Claim 43 wherein said non-peptide-based polymer contains a hydrogen-bonding amine and/or a nucleophilic group.
45. (original) The method of Claim 24 wherein said product is a silsesquioxane.
46. (original) The method of Claim 24 wherein said product is a polyorganosiloxane.
47. (original) The method of Claim 24 wherein said product is a polymetallo-oxane.
48. (original) The method of Claim 24 wherein said product is a polyorganometallooxane.
49. (original) The method of Claim 24 wherein said product is a polyorganometalloidoxane.

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50. (original) The method of Claim 1 in which said catalyst molecule is self-assembling whereby said structure-directed condensation is provided by a spatial array of structure-directing determinants contained on or within the self-assembling catalyst molecule.
51. (original) The method of Claim 50 in which said spatial array of structure-directing determinants acts in conjunction with the surfaces of any solid support to which said catalyst molecule is attached or in which said catalyst molecule is confined.
52. (original) The method of Claim 50 wherein said catalyst molecule is selected from the group consisting of silicatein, protein, enzyme, peptide, and non-peptide-based polymers, and/or any aggregate, filament, or other assembly thereof.
53. (original) The method of claim 1 in which said nucleophilic group is provided by a hydroxyl or sulfhydryl group.